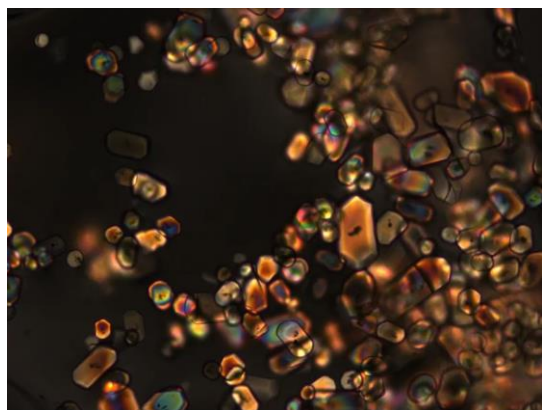


## Project: Experimental investigations of the magmatic-hydrothermal transition in carbonatites & the factors controlling REE and CM enrichment

**Position Overview:** The Centre in Critical Resources for the Future (CCRF) is offering a PhD scholarship in partnership with the Australian National University (ANU). This opportunity is ideal for a highly motivated graduate interested in exploring magmatic hydrothermal transitions associated with carbonatites and rare earth and niobium deposits. The project will combine high-pressure experimentation with advanced synchrotron-based techniques to uncover new insights into these complex geological systems.

### Project Description:



The PhD research will focus on the fractionation processes of carbonatites towards highly evolved liquids, such as magmas, brines, melts, or other fluids. The successful candidate will use cold seal and piston-cylinder experiments alongside synchrotron-based spectroscopic methods, including:

- X-ray Absorption Spectroscopy (XAS)
- X-ray Absorption Near Edge Structure (XANES)
- Extended X-ray Absorption Fine Structure (EXAFS)

The aim is to:

- Characterise the fluid and melt structures produced under high-pressure and high-temperature conditions.
- Investigate the metallogenic properties and transport mechanisms of these fluids.
- Enhance our understanding of rare earth element deposits and niobium mineralization, with a particular focus on carbonatites in Western Australia.

**Your Role:** As a PhD candidate, you will have the unique opportunity to work under the guidance of leading experts:

- **Prof Greg Yaxley - Primary Supervisor**
- Prof Andrew Berry
- Professor John Mavrogenes

**Industry Collaboration:** You may spend 12 months embedded with one or more of our industry partners